




UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

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OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: AERSCREEN Released as the EPA Recommended Screening Model

FROM: Tyler Fox, Leader 
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TO: EPA Regional Modeling Contacts

INTRODUCTION

In August 2010, EPA released a beta version of AERSCREEN with draft user's guide and test cases, taking public comment until September 30, 2010. These comments ranged from "bug" fixes to suggested AERSCREEN enhancements. After incorporating "bug" fixes and user comments, EPA released version 11060 of AERSCREEN on March 11, 2010 with a subsequent update, version 11076, on March 17, 2010. Version 11076 corrected an error found in version 11060. The release package includes AERSCREEN (Fortran source code and executable), a User's Guide, the MAKEMET meteorological data generator, and AERSCREEN test cases. AERSCREEN uses the AERMOD executable, ensuring consistency with the refined model, and also utilizes the BPIPPRM building processor and AERMAP terrain preprocessor as needed to account for building downwash and terrain effects. AERSCREEN can be found on the Support Center for Regulatory Atmospheric Modeling (SCRAM) website:
http://www.epa.gov/ttn/scram/dispersion_screening.htm#aerscreen

RECOMMENDATION OF AERSCREEN AS SCREENING MODEL

The recommended simple terrain screening model in *The Guideline on Air Quality Models* (Guideline, published as Appendix W to 40 CFR Part 51) has been SCREEN3. However, AERSCREEN (the single source screening version of AERMOD) is now available as a full release or non-beta version. This memorandum clarifies the replacement of SCREEN3 with AERSCREEN as the recommended screening model.

With respect to AERSCREEN replacing SCREEN3, the preamble of the 2005 rule promulgating AERMOD as the preferred *Guideline* model for a wide range of regulatory applications in all types of terrain states (See 70 FR at 68221):

“With respect to a screening version of AERMOD, a tool called AERSCREEN is being developed with a beta version expected to be publicly available in Fall 2005. SCREEN3 is the current screening model in the *Guideline*, and since SCREEN3 has been successfully applied for a number of years, we believe that SCREEN3 produces an acceptable degree of conservatism for regulatory applications and may be used until AERSCREEN or a similar technique becomes available and tested for general application.”

This language clearly implies that AERSCREEN will become the recommended screening model once it is released. In addition, since AERSCREEN is the screening version of AERMOD, EPA’s preferred model for near-field dispersion, it follows that AERSCREEN would become the recommended screening model once available. The SCREEN3 model is essentially a screening version of the ISCST3 model, which was replaced by AERMOD, and is subject to the same limitations as ISCST3.

Similar to SCREEN3, AERSCREEN allows for user entry of emission inputs, source coordinates, building information (for downwash), receptor information, and meteorological information in a quick and easy fashion, either through an input file, or interactive prompts. However, AERSCREEN incorporates several enhancements relative to the SCREEN3 model. For example, AERSCREEN generates application-specific worst-case meteorology, via MAKEMET, that takes full advantage of the boundary layer scaling algorithms implemented in the AERMET meteorological processor using representative minimum and maximum ambient air temperatures, and site-specific surface characteristics (albedo, Bowen ratio, and surface roughness). AERSCREEN incorporates the PRIME downwash algorithms that are part of the AERMOD refined model and utilizes the BPIPPRIM tool to provide a detailed analysis of downwash influences on a direction-specific basis. AERSCREEN also incorporates AERMOD’s complex terrain algorithms and utilizes the AERMAP terrain processor to account for the actual terrain in the vicinity of the source on a direction-specific basis.

The question has also arisen about the role of screening modeling and refined dispersion modeling under Appendix W. Section 2.2 of the *Guideline*, explains that:

“[t]he purpose of such [screening] techniques is to eliminate the need of more detailed modeling for those sources that clearly will not cause or contribute to ambient concentrations in excess of either the National Ambient Air Quality Standards (NAAQS) or the allowable prevention of significant deterioration (PSD) concentration increments. If a screening technique indicates that the concentration contributed by the source exceeds the PSD increment or the increment remaining to just meet the NAAQS, then the second level of more sophisticated models should be applied.”

In recent years, the use of screening models has been largely replaced with refined dispersion modeling because of advancements in computing power and the wider availability of

representative meteorological data that are needed to apply refined models. In this context, the primary regulatory purpose for application of a screening model would be to determine whether site-specific meteorological data would be required for a proposed source if no other representative meteorological data are readily available. However, a screening model such as AERSCREEN can also be a useful tool to estimate potential impacts during the design and planning stages of a project.

SUMMARY

In summary,

- AERSCREEN has been released and is available on the SCRAM web site.
- AERSCREEN is based on AERMOD, EPA's preferred near-field dispersion model, and replaces SCREEN3 as the recommended screening model based on the *Guideline on Air Quality Models*.

If there are any questions regarding AERSCREEN, please contact James Thurman of EPA's Air Quality Modeling Group at (919) 541-2703 or thurman.james@epa.gov.

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